

Supplementary material

Identification of the hydrogeochemical processes and assessment of groundwater quality using multivariate statistical approaches and water quality index in a wastewater irrigated region

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Table S1. Number of clusters suggested by each index.

Índex	Number of clusters suggested
KL, CCC, Duda, PseudoT2, PtBiserial, Frey, McClain, SDindex	2
Hartigan, Ball	3
Marriot, TrCovW, TraceW, Cindex	4
Beale, Ratkowsky	5
Rubin, Silhouette	7
DB	9
CH, Scott, Dunn, SDbw, Friedman	10

Table S2. Basic statistics of analyzed hydrochemical parameters in the study area.

Parameter	Minimum	Maximum	Mean	S.D.
Temperature	18.4	33	25.46	3.52
pH	7.64	8.62	8.06	0.21
EC	412	2280	1043.93	474.45
TDS	295.12	1643.47	699.62	311.79
Ca ²⁺	21.64	188.78	67.63	35.25
Mg ²⁺	2.79	39.37	16.32	8.76
Na ⁺	5.56	440.95	115.70	90.39
K ⁺	0.12	24.48	11.93	6.50
TH (CaCO ₃)	73.06	528.92	236.10	103.11
Cl ⁻	34.03	268.85	114.56	64.79
SO ₄ ²⁻	4.08	448.94	93.44	89.81
NO ₃ ⁻	5.7	83.29	25.78	19.13
SAR	0.14	13.02	3.49	2.87
HCO ₃ ⁻	89.24	479.01	244.70	91.32
CO ₃ ²⁻	3	30	10.04	6.70

Units: Ion concentration (mg/L), pH (Standard Units), EC (μ S/cm), TDS (mg/L), Temperature ($^{\circ}$ C). S.D indicates standard deviation.

Table S3. Correlation of groundwater quality with WHO and Mexican Official Standards for drinking purposes.

Parameter	NOM-127-SSA1-1994	WHO	Maximum	Mean
Temperature	---	---	33	25.46
pH	8.5	8.5	8.62	8.06
EC	500	500	2280	1043.93
TDS	1000	500	1643.47	699.62
Ca ²⁺	---	75	188.78	67.63
Mg ²⁺	---	50	39.37	16.32
Na ⁺	200	200	440.95	115.70
K ⁺	----	10	24.48	11.93
TH (CaCO ₃)	500	300	528.92	236.10
Cl ⁻	250	250	268.85	114.56
SO ₄ ²⁻	400	250	448.94	93.44
NO ₃ ⁻	45	45	83.29	25.78
HCO ₃ ⁻	500	500	479.01	244.70
CO ₃ ²⁻	---	---	30	10.04

Units: Ion concentration (mg/L), pH (Standard Units), EC (μS/cm), TDS (mg/L), Temperature (°C), --- Not available. NOM-127-SSA1-1994: Mexican Official Standard (NOM-127-SSA- 1994). WHO: World Health Organization (WHO 2011).

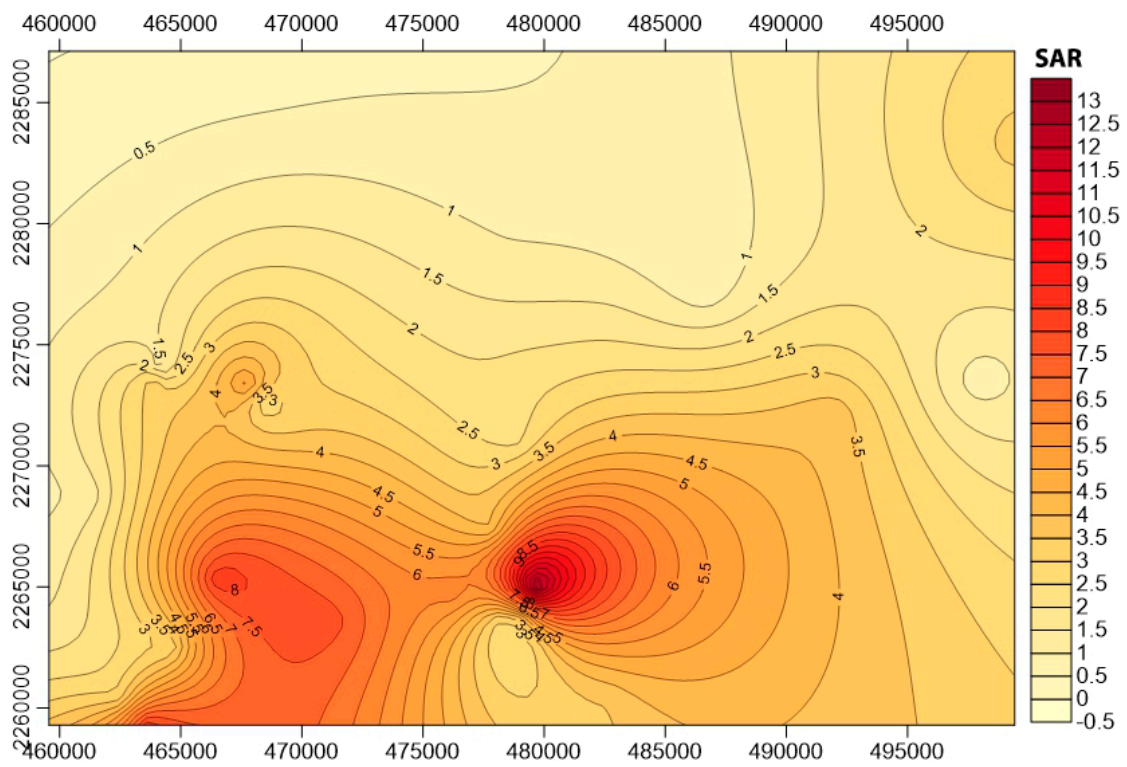


Figure S1. Spatial distribution map of the Sodium Adsorption Ratio (SAR) in the study zone.

References

NOM-127-SSA-, 1994. Mexican Official Norm. Environmental Health, Water Use and Human Consumption: Permissible Limits of Quality and Treatments to Be Bound Water for Drinking Water. In. <http://www.salud.gob.mx/unidades/cdi/nom/m127ssa14.html>.

WHO, 2011. (World Health Organization). Guidelines for drinking water quality. In.